VOL. IV. NO. 201.

GARDEN AND FOREST

A JOURNAL OF HORTICULTURE LANDSCAPE ART AND FORESTRY

DECEMBER 30 1891

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White Pines. (Illustrated.)
EDITORIAL.

Crosses and Crossing in Plants.
By PROFESSOR L. H. BAILEY.

A Greenhouse for Amateurs. (With diagram.)
By J. N. GERARD.

New Orchids.
By R. A. ROLFE.

The paper will contain two illustrations of Pinus Monticola, from photographs.

GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, DECEMBER 30, 1891.

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The Old Age of the Year.

THE mildness of the recent season has made the usually cheerless month of December a period of enjoyment. Sunny skies and a warm temperature enduring until the holiday season have rendered outdoor employments not only possible, but agreeable, even during the very shortest days of the year. Fortunate are they who have taken advantage of this opportunity to complete the delayed tasks which properly belong to autumn. The unfrozen ground has permitted the transplanting of trees and shrubs, although late labor of this sort is of doubtful propriety. The planting of trees in autumn should be completed early, so that the roots may have time before deep freezing to throw out feeders to supply the moisture which drying winds absorb from the limbs all winter long. On the other hand, every hour has been well spent which has been devoted to the preparation of the ground for spring-planting. Large spaces deeply-trenched for trees will have time to settle and solidify during winter, and give a firm basis and compact feeding-ground for young roots. Recently worked soil, with its open air spaces, is not in the proper mechanical condition to receive the roots of a tree, and it is hard to bring it to the required firmness by ramming or tramping. The late December, too, has been an admirable time for studying plantations already made, for after the leaves have fallen it is easier to decide which trees should be removed or pruned. The weather has been unusually favorable for all pruning operations, whether undertaken to rejuvenate old trees or improve unsightly ones. It is yet in order to cover beds of Lilies or other plants which enjoy a protective mulch which does not exactly keep them warm, but insures a uniform temperature and guards against the alternate freezing and thawing which injures their cell-structure.

But even after all thought of work is over a stroll down the sunny paths of the garden of an afternoon has a charm of its own, although the bare twigs have lost their summer beauty. A few hardy plants still show fresh green foliage, and on many shrubs the berries hang, to give a flash of color here and there. The grass is yet green or a soft golden brown, and the trees with their grace of bare outline, the variety of tint and texture shown in their bark and the delicate tracery of their interlacing branches against the sky, are quite as attractive as at any other season. The twittering of a few lingering birds, the soft odor of the Firs and Pines, the mildness of the air, delude us into hoping that this second Indian summer may hold over into another year. But the most seductive of these days are often the precursors of wild storms, and one wakes after a moonlit evening of delight to find the ground white with snow, and a lowering sky bending over the frozen earth.

The old age of the year is treacherous. Chill and paralysis attend it, its days are brief, its nights are long. In storm and darkness it creeps to its end. However it may put on the semblance of life and warmth, death and icy cold are at hand, and the last leaves are dropping into its open grave. It is the period of retrospect, the time for getting rid of the cast-off garments of the past, and clothing ourselves afresh for the coming of the New Year. But if the last week of the old year be a reminder of disappointments, there yet lingers in it that hope which is freshly born with its lengthening days. Though the sap be chilled in the branches of the trees, it still stirs in the trunks and warms the roots, and prepares in silence the new growth. The old leaves help to protect and nourish the young shoots; from death issues life; and so the great unending cycle sweeps on, explaining to us that all is but change. End there is none, only rest and new birth, the burial of the seed and the resurrection of the plant, the sorrow of evening and the joy of the dawn, the passing of the old year and the happy birth of the new. This lesson of the garden and the forest is a lesson of comfort and cheer. It upbears the mind in failure, and encourages it to renewed effort and to patient waiting for results. The seed shall not fail to bear fruit, even if long hidden from view in the bosom of the earth, which buries but to nourish, and destroys but to bring new life.

IN another column of this issue will be found an interesting account of the nursery of Mr. George W. Vanderbilt, near Biltmore, North Carolina, together with a sketch of the proposed forest and arboretum so far as their plans have been matured. This enterprise is wholly of a private character, and the account seems to have been prepared for a magazine of local circulation to meet the natural interest in the undertaking which has been manifested by Mr. Vanderbilt's neighbors. We reproduce it, however, because the matter is of more than local importance, and because this is the first authentic publication that has been made of the scope and purpose of the work. The establishment of a nursery containing such a variety of woody species is of itself an event of the first importance to all intelligent lovers of trees; and if the arboretum project is carried out upon the lines indicated, it will become an institution of world-wide usefulness. Of course the project now is only a promise, and the realization of its possibilities in full measure can only be attained after years of patient study and labor, of study and labor, too, organized and directed and controlled by the broadest knowledge and the most thorough training which the age can furnish. The conception, however, is a noble one, and it is encouraging to be assured that the foundations of the work have been laid with intelligence and care. The almost unparalleled richness of the southern Appalachian region in species of trees and shrubs, and the number of exotics which would thrive on the banks of the French Broad River, warrant the belief that a collection of unrivaled interest and value could be established there, while the grandeur and beauty of the natural scenery of western North Carolina must prove an inspiration to any artist of

creative genius who is entrusted with the landscape design.

As we have said, this is a private enterprise purely; and yet the span of a human life is so short when compared with the possible life and the ever-growing influence of a well-ordered arboretum, that the project can hardly be conceived of in any other way than as a great institution, or, rather, in connection with the forest and other features of the plan, a cluster of institutions, devoted to special science and art. Indeed, it cannot fail to be a centre of educational influence in forestry, arboriculture and landscape-art, so long as it has any lusty life, whoever may direct it. Looking, therefore, at the enterprise in its essential relations to popular education in science and art, we may be allowed to express the hope that provision will be made to ensure its perpetuation. It is not often that men of wealth and public spirit find so worthy an object for their generous impulses.

Notes of a Summer Journey in Europe.—III.

BEFORE leaving Geneva for Pallanza, on the other side of the Alps, a short excursion was made to some of the villages along the northern shore of the lake, and opportunities were found for a ramble through some of the vineyards which cover every hill-side. To persons always accustomed to the prevailing American mode of pruning Grape-vines by leaving one or more long stems and training them to high trellises, the system practiced here at first seems strange. The old portions of the plants look like stumps, generally not more than a foot above ground. At the top of the stump are from two to four short arms, two or three inches in length, and from each of these arms one or two shoots are allowed to grow and bear from one to three bunches of grapes. At pruning-time these shoots are cut back to the stumps again. In some vineyards the stumps appeared old, and were entirely moss-covered, the moss sometimes being as much as an inch and a half thick. Some rather small stumps were said to be at least thirty years old. The vines are usually tied to slender stakes about four feet in height, the tying material being simply one or two stalks of Oat-straw or other Grass-plant, with the ends tied or made fast by a neat twist. So diminutive do these vines appear in comparison to those trained on our system, that from a distance or from a train they seem more like Peas or Tomato-stalks trained to stakes.

The vines are planted quite near together, and, apparently, hand-labor is entirely depended upon in the cultivation of these vineyards. Indeed, toward the upper end of the lake, anything but careful hand-labor would be impossible on account of the great steepness of the hill-sides, which are faced with stone walls supporting terrace upon terrace, so that the soil cannot be washed away. The situation is exceedingly favorable for Grape-culture; every foot of land fit for it is made use of, and one is impressed with a sense of thrift and economy in such intense cultivation. At Nyon some rather weedy vineyards were noticed, and laborers were busily hoeing out such weeds as Mustard, Chickweed, a pretty flowering but pernicious Bindweed, or Convolvulus (*C. arvensis*), Potentillas with long runners, and Canada Thistles, the latter in full bloom.

The dreaded Phylloxera has apparently not yet gained a foothold here, and the vines generally seemed very healthy. They had not long ceased flowering, and the little grapes were mostly just well-formed (July 21st). Many of the bunches were infested by little lepidopterous larvæ, or caterpillars, one or more of which attack a bunch. They spin little silken tubes, within which they live separately, and generally accomplish the destruction of a considerable portion of the cluster of fruit.

After leaving the lake, and on proceeding toward Brieg, on the Simplon Road, Apple-trees and orchards become more common, and are usually found in land which is kept in grass. Our common Locust is thoroughly naturalized, and grows as rampantly as a weed all along the railway. Above Brieg, on the Simplon Road, the Walnut-trees were bearing no fruit, the young tips and blossoms having been destroyed by frost. The mountain-sides were still covered with flowers, most noticeable among them being several kinds of Campanulas. On descending toward the Italian frontier, the native Clematis (*C. Flammula*) becomes conspicuous everywhere, strongly suggesting our own Virgin's Bower. Farther down in the valleys the Walnut is again abundant. The young walnut fruit is here much destroyed by lepidopterous larvæ, which cause the immature nuts to drop during the summer, the injury being analagous to that caused by the codlin-moth among apples.

As soon as we cross to the Italian side of the Alps and get to the region about Lake Maggiore, we find the treatment of the Grape-vines to be very different from that practiced around the Lake of Geneva. Here the vines are allowed to grow long, as we are most accustomed to see them, and they are trained to tall poles or trellises, or very commonly to living trees. The tree most selected for this office is the common Field Maple (*Acer campestre*), a species which does not generally grow to a very large size. Most of the branches are removed, only enough being left to keep up the life of the tree. The removal of the branches allows the sun and air to have free access to the vine, while its living support has at least the advantage of not needing frequent renewal; although, on the other hand, it must take considerable nutriment from the ground, which should otherwise be appropriated by the vine. The practice is one which will hardly commend itself to thrifty cultivators.

The main object of my excursion south of the Alps was to visit some of the gardens at Pallanza on Lake Maggiore, particularly the gardens and nurseries of the Messrs. Rovelli. The rows of thrifty specimens of our great Southern Evergreen Magnolia, planted here as a street and shade tree, at once indicate that Pallanza enjoys a climate peculiarly favorable for trees and other plants of warm, temperate regions. Handsome high hedges and immaculate clipped walls of what is called *Elæagnus pungens* showed how thoroughly acclimated is this Japanese species, which we have not yet been able to grow well where the temperature is liable to go a good many degrees below zero of Fahrenheit.

The nurseries of the Messrs. Rovelli are not kept as an exhibition or show-place, in the popular sense of the term; but, although no studied attempt is made to produce landscape or floral effects, there is much to please and repay any one who may be able to spend a few hours there.

The greatest interest in the place rests in the fact that here we find large, characteristic, and often handsome specimens of a great number of rare trees, shrubs and other plants which the firm propagate; so that the visitor who personally goes to this nursery with the intention of purchasing may obtain a fair idea of the size, effect and other characteristics which his plants may develop when they attain to a good age and large proportions. Conifers and other evergreens are most largely represented among the arborescent plants, and we find here such well-grown specimens of Pines and other trees as are rarely seen in the collections which the average traveler is likely to visit.

One of the rarities of the garden and an object of special pride is a handsome specimen of the so-called Chinese Golden Larch (*Pseudolarix Kæmpferi*), which is as much at home in this mild Italian climate as it is when subjected to the extremes of heat and cold, which it endures so well in the vicinity of Boston. This specimen produces fruit biennially, and the seed is allowed to fall and germinate beneath the tree, as greater success in procuring young plants is obtained in this way than by any artificial sowing which has been tried. The ground was covered with thousands of young seedlings, whose light-green foliage formed a complete and very pretty covering.

A specimen of the Monterey Cypress (*Cupressus macrocarpa*), at forty years of age, has a trunk three feet in diameter, and makes a handsome tree; and, besides other large Cypresses, here also are good representatives of the Sequoias (*S. sempervirens* and *S. gigantea*), the first ninety feet high, while of the latter a curious pendulous form was pointed out as one of the novelties of the nursery.

A specimen of *Cryptomeria Japonica*, from fifty to sixty feet high, is the finest I saw anywhere. This has not yet proved hardy enough to thrive well at the Arnold Arboretum. A large specimen of the rare and beautiful Californian *Abies bracteata* thrives here, and produced fruit some years since. The very long, sharp-pointed leaves, which are white beneath, and the curious long-bracted or porcupine-like cones make this one of the most distinct and remarkable species of the genus. Another curious tree is *Keteleeria Fortunei*, long considered by many botanists as an Abies, and known as *A. Fortunei*. Its right to a distinct generic name now appears to be well established. This species is a native of south-eastern China, and is only hardy in warm temperate or sub-tropical regions. It may truly be called a very rare tree outside of its native habitat, the Messrs. Rovelli having the largest and finest in cultivation. This individual tree has a trunk two feet in diameter, covered with a curious corky bark resembling that of the Cork Oak. Although it produces cones in

abundance, it has not, owing to lack of pollen, produced perfect seed. It is propagated by grafting on stock of the common European Silver Fir (*Abies pectinata*), while a limited number of own-rooted plants are also produced by fastening rings of damp sphagnum to the branches in the same manner that many greenhouse-plants are rooted. Among other Firs were fine examples of Nordmann's and the Cilician Fir. The first is well known as being quite hardy at Boston, while the other is somewhat more tender. *Cunninghamia Sinensis*, *Podocarpus Chilina*, *Fitzroya Patagonica* and Araucarias (fruiting) were some of the other most interesting conifers noted, and which we are accustomed to see only as pigmy plants in greenhouses.

Reference to the Pines should not be omitted, for a number of fine examples are to be seen here. *Pinus Canariensis*, an insular species from Teneriffe, seems to be a favorite and does well, and a Himalayan species (*P. longifolia*) attracts attention by its curious long-leaved foliage. Among our American species we find here the Californian *P. insignis*, one of the most ornamental Pines in cultivation, but, of course, not hardy in our northern gardens, and the Long-leaved or Georgia Pine (*P. palustris*), which is not more enduring, although some of our nurserymen have led many amateurs into buying it. Of several Mexican Pines, one of the prettiest is *P. patula*, while another long-leaved one appears to be a form of *P. Montezumæ*.

Several species of Palms prove quite hardy in the open air. Among these the most interesting and remarkable is a specimen of the beautiful Coquito Palm (*Jubæa spectabilis*), of Chili, forty or forty-five years old, twenty feet in height, and with a trunk almost three feet in diameter. An example of *Cocos australis* was in flower, and the Japanese Fan Palm seemed quite at home. Quite a variety of Bamboos have been brought together, some of them being twenty or twenty-five feet high. One of the specialties of the establishment is the cultivation of Camellias, of which there are a great variety growing in the open air, while their near relatives, the Tea-plants, are to be seen growing beside them.

Much more is to be seen here than can be well indicated in these notes, and any one interested in the fruits of warm temperate regions will also find much to study. Twelve or fourteen varieties of the Japan Persimmon (*Diospyros Kaki*) are grown, and the fruit is said to be gaining in popular favor.

An old friend was noted in the herbaceous Asiatic Lespedeza, which, in a particularly warm spot, was expanding its very first flowers (July 23d). This pretty, rosy purple flowered, leguminous plant is apparently no more shrubby at Pallanza than it is in our northern gardens, where it blooms in the autumn. Unfortunately, it is most widely known as *Desmodium penduliflorum*, a name which should no longer be kept up, as by its botanical characters the plant is a true Lespedeza.

Arnold Arboretum. *J. G. Jack.*

George W. Vanderbilt's Nursery.

AN article under the above title appears in the December number of *The Lyceum*, a magazine published in Asheville, North Carolina. We have made allusion to it in our editorial columns, and herewith reproduce the greater portion of it. It was prepared at the request of the editor of *The Lyceum* by Mr. Frederick Law Olmsted, whose name is a guarantee that it is authoritative.

1. It is intended that the greater part of the estate with which the nursery is connected shall be occupied by a systematically managed forest, constituted mainly, at least, of such trees and bushes indigenous to the region as are likely to be of commercial value. This forest will be in a large part formed by the improvement, through thinning and otherwise, of the present young "second growth," but considerable spaces, now bare of trees, or the trees on which are unpromising, will be planted. The extent of the forest is to be fully 4,000 acres.

2. Roads will be carried through the forest, in the laying out of which the motive of convenient transportation from its different parts will be modified by regard for picturesque interest, and the immediate borders of a part of these roads are to be planted with the object of gradually forming more interesting foregrounds than might otherwise be presented to view from them.

3. It is proposed to make a plantation, three or four miles in length, along the borders of a certain series of the forest-roads which will contain a few specimens, suitably classified and arranged for study, of each of the native trees of the region, and of all other trees that can be obtained from any part of the world with a reasonable hope that they will flourish under the conditions of climate and soil of the locality. This will be "The Arboretum"; in effect an Experiment Station and Museum of living trees. It may be hoped to be of considerable national value, as the trees acquire their mature character, perhaps fifty years hence.

4. It is intended to gradually form in some of the glens of the estate, passages of local scenery resembling those naturally occurring in many similar situations in the mountain-regions of North Carolina, of which the more notable constituents are lustrous smooth-leafed evergreens, such as the Rhododendrons and Kalmias, Ilexes and the Leucothœ. In the glens there are occasional partly flooded or water-soaked areas, in or on the edges of which grow Cane, Bullrushes, Sagittarias and other aquatic forms of vegetation, mostly herbaceous. With masses of such evergreens as have been indicated above, it is designed to associate a comparatively small number of foreign bushes of a generally similar, glossy, evergreen character, by the introduction of which, if it can be successfully accomplished, greater variety and grace of form and vivacity of tint, and, at points, more complex intricacy of effect may be obtained than if the planting were to be confined strictly to natives. Also the attempt will be made to naturalize a few foreign plants, as, for instance, certain Bamboos, Nelumbiums and Nymphæas, each having qualities of its own, differing from, but to be pleasingly associated with, those of the native aquatic and water-side plants.

In the nursery there are now under propagation, or already in cultivation, young trees and bushes for each of the four above-stated purposes. Of such of these as are designed to be used either directly, or as stocks for propagation, for the Arboretum, there are two or more examples each of four thousand two hundred species and varieties. Of the different species of Rhododendron, Kalmia, Leucothœ, Andromeda, Ilex, Laurus, Osmanthus, Aucuba, Abelia and other smooth-leafed evergreens collected or otherwise obtained with a view to the fourth class of plantations above defined, there are now in the nursery, or planted on the banks of Ram branch, 20,000 plants, not including those intended as ground-covering, such as Ivies, Evergreen, Loniceras and Running Roses, Hypericum, Periwinkle, etc., of which the present stock is about 100,000. Among the Rhododendrons there are two examples each of four hundred hybrid varieties, mostly the result of crossing the Catawba Rhododendron, growing naturally on the high mountain-tops of North Carolina, with others largely obtained from the Alpine regions of Europe and from the Ural and Himalayan mountain of Asia.

All of the plantations described are intended, as they come to maturity, to have a natural aspect, and to stand in harmonious and modestly subordinate relations with the general landscape of this region of country. There will be a small space of "kept grounds," near the dwelling of the proprietor, which, for the most part, will be laid out formally, with a view to domestic convenience and correspondence with the buildings, consequently, with a clearly defined demarcation from the natural landscape. There will be but little space given on the estate to what are commonly called "ornamentals," and none to the exhibition of mere curiosities, eccentricities or rarities of vegetation. There is, consequently, little in the nursery of special interest from a gardening point of view. Its stock of trees and bushes of merchantable size now numbers about 100,000; of seedlings and cuttings propagated on the grounds during the last year, about 500,000. Some of the stock having been brought long distances (part from southern Europe, part from Japan) and delayed on the passage, is not at present looking very thrifty, but after the next winter's rest is expected to fully recover.

The entire undertaking looks to results that can be fully realized only after many years, and, except to a botanist, its value lies in its promises and experiments rather than its actualities.

New or Little-known Plants.

Spiræa discolor, var. ariæfolia.

THE panicle of flowers of *Spiræa discolor*, var. *ariæfolia*, figured on page 617, is from a photograph of a specimen grown during the past summer in the Arnold Arboretum, where it bloomed better than it has ever done before, no doubt owing to the comparative mildness of the past two winters and to a moderate amount of winter protection given to it. Perhaps, also, it is one of those plants which are apparently hardier after they attain a considerable age. Although one of the most beautiful of all the Spiræas, it

unfortunately is not, or, at least, has not proved sufficiently hardy so far to always withstand our New England winters without some shelter or protection. On this account it is rarely seen here as it cannot be planted with any assurance of giving satisfaction. It is not impossible that hardier strains may yet be procured from higher altitudes or colder latitudes. Its native habitat is mainly west of the Rocky Mountains, where it is said to range from southern California northward through Oregon and Washington and into British Columbia at least as far north as the forty-ninth degree of latitude.

This variety was originally described as a separate species under the name of *Spiræa ariæfolia*, and as such it is still commonly known in catalogues and collections. Later botanists have relegated it to the rank of a variety of *S. discolor*, an apparently extremely variable species, as there is at least one other distinct botanical variety (var. *dumosa*) recognized, which, being less northerly in its distribution, is not so hardy as the form under consideration.

Under cultivation and favorable circumstances this Spiræa becomes a large shrub ten or twelve feet high and as much as fifteen feet in diameter. The branches are slender and covered by a very minute pubescence. The bark is at first light gray in color, but after the second year it is dark brownish gray. When young it is marked by minute longitudinal ridges, which become obsolete with age. The foliage is usually so abundant that the stems are well covered.

As the name denotes, and the figure shows, the leaves have the outline and pinnatifid lobing which gives them some resemblance to the leaves of certain forms of the European Beam-tree (*Pyrus Aria*), but this character is common to the other variations. They vary from one to two or three inches in length, and are usually quite densely covered on the under surface with a close grayish pubescence.

In this latitude the blossoms usually begin to open in the last days of June or early July, and flowering is continued for about three weeks.

The individual blossoms are small and of a pale greenish white color, so that the whole panicle has a rather dull white effect. The large loose feathery, much-branched panicles are produced at the ends of the shoots, and are frequently very much larger than shown in the figure. They are borne in as great profusion as the panicles on a well-grown *Hydrangea paniculata*, and, in a manner, are almost as effective, though lacking their pure white lustre.

The odor of the flowers has been described as that of Sweet Birch, but it is as strongly suggestive of honey, with perhaps a faint hint of Chestnut-blossoms which renders them not entirely agreeable to many people.

Seed is freely produced, but it is not easily separable or distinguishable from the chaff or remains of the withered flowers, which are so persistent that they still adhere when the leaves have fallen. Plants may either be reproduced from seed, or more speedily by layers, or from cuttings of green wood started in sand under glass. They do not spread much from underground shoots. It was early introduced into European gardens, and was brought to England in 1827. Wherever it is hardy it is deservedly much esteemed; and it is particularly valuable because it blossoms at a later season than the vast majority of shrubs.

Although we have spoken of it as a Spiræa, it should be noted here that the late C. J. Maximowicz, in his monograph of the Spiræas, places *S. discolor* under a separate genus, the generic name proposed being Holodiscus, which was first used as a subsection of Spiræa. He removed it entirely from that genus, as he considered that it was related to the Potentillas, and that it was also allied to the Raspberries by its two pendulous ovules.

Maximowicz did not recognize the varieties of *S. discolor* as they are designated in botanical works, and, besides these, he also included one or two other plants which had been described as species and whose range extends through Mexico and as far south as Guatemala.

With the present tendencies toward creating and more sharply defining genera, it is not at all unlikely that the classification of Maximowicz will come to be universally accepted, and that our plant may finally be known as *Holodiscus discolor*, or, if there proves to be sufficient difference to warrant keeping up the varietal name, as *H. discolor, ariæfolia.* Indeed, the name Holodiscus is already in use in some botanical gardens, and is taken up in Coulter's "Manual of the Botany of the Rocky Mountain Region."

Arnold Arboretum. *J. G. Jack.*

New Orchids.

Aërides Lawrencæ, var. Amesiana, Sander.—A robust and handsome variety, with short, rigid dark green leaves, and the purple tips of the sepals and petals broader than usual. It is said to be like a dark-colored form of the variety Sanderiana in the flower, but to differ in habit. It was introduced by Messrs. F. Sander & Co., of St. Albans.—*Kränzlin, in Gardeners' Chronicle*, October 3d, p. 393.

Cypripedium Godefroyæ, var. luteum, O'Brien.—A very pretty variety, with the ground color of a clear soft primrose-yellow, and the spotting pale rosy lilac. It appeared in a batch of the ordinary form in the collection of Messrs. Hugh Low & Co., of Clapton.—*Gardeners' Chronicle*, October 3d, p. 393.

Cypripedium × Enfieldense, Hort.—A handsome hybrid, raised in the collection of A. J. Hollington, Esq., Forty Hill, Enfield, by Mr. Ayling, from *C. Lawrenceanum*, crossed with the pollen of *C. Hookeræ*. It is like an improved *C.* × *marmorophyllum*, in which *C.* × *barbatum* takes the place of *C. Lawrenceanum*. The leaves are much like those of the two parents. The dorsal sepal is very broadly ovate and subacute, stained and nerved with purple on a light green ground, paler toward the margin. The petals are deflexed and much like those of *C. Hookeræ* in their bright purple color, but not quite so broad near the apex. The lip and staminode are intermediate in character.—*Gardeners' Chronicle*, November 7th, p. 546.

Phajus maculato-grandifolius.—This is a handsome hybrid, raised by Mr. Seden for Messrs. James Veitch & Sons, of Chelsea, from *P. grandifolius*, crossed with the pollen of *P. maculatus*. It has the general habit of the mother plant, but the leaves are rather thinner than those of that species, and have a few yellow spots as in the pollen parent. The spike is nearly three feet high, with the flowers about as large as those of *P. grandifolius*. The sepals and petals are yellow, with a slight coppery tinge, and the lip yellow at the base, with its infolded front lobe chestnut-red, and some lines of the same color extending to the base of the lip. It was awarded a first-class certificate by the Royal Horticultural Society on November 10th last.—*Gardeners' Chronicle*, November 14th, p. 591.

Kew. *R. A. Rolfe.*

Foreign Correspondence.

London Letter.

Bulbous Plants.—Among the species of Crinum cultivated at Kew there are several which usually flower in winter. The following are in bloom now, and will continue so until the end of the month: *C. angustum.* This is one of the handsomest of the large evergreen tropical species. It forms a specimen as large almost as the *C. Asiaticum*, figured early this year in Garden and Forest, the thickness and length of the stem-like neck of the bulb and the width and length of the fleshy bright green foliage being very similar to what I described in that species. In the flowers, however, *C. angustum* is much more attractive, each flower being fully six inches across. The segments are narrow and recurved, and they are colored rich deep crimson, paler on the inside. There are as many as thirty flowers in a single head, and they open in slow succession. The species is a native of Mauritius and the Seychelles, whence it was introduced to Kew seventy years ago. I do

not see any difference between this and *C. amabile*, which is also now in flower at Kew. They are alike in all characters, and on turning to Mr. Baker's description of these two species in his "Amaryllideæ" I perceive that both descriptions are essentially the same. There is, however, the difference in geographical position, that called *C. amabile* being a native of Sumatra. *C. Hildebrandti* is another evergreen species, and one which is very easily kept in health in a stove. It has a neck a foot long, is almost leek-shaped in fact, with strap-shaped leaves eighteen inches by two inches. The flowers are borne in an erect head on a scape a foot high, and are remarkable for the length of the tube, which is from six to eight inches long, and perfectly straight. The segments are three inches long, narrow, spreading and recurved, pure white. We have had this species in flower twice already this year. It is a pretty pot-plant, and not too large for the ordinary shelf in the stove. It was sent from Johanna Island, off the south-east coast of Africa, in 1875, to Berlin, by the collector Hildebrandt, and a few years later to Kew by Sir John Kirk. Although found at an altitude of 3,000 feet, it suffers from cold if kept in an ordinary greenhouse. *C. bracteatum* is similar in general characters to *C. pedunculatum*, but does not grow to so large a size. It has a short thick neck, broad fleshy leaves, and a flattened scape a foot long, bearing numerous pure white flowers two inches across. The stamens are reddish. Originally from the Seychelles, but now well known in cultivation in the tropics. *C. pedunculatum* is quite as large as the common *C. Asiaticum*, the only difference between the two being in the size of the

Fig. 98.—Spiræa discolor, var. ariæfolia.—See page 615.

flowers and in the number of ovules. They are both noble stove-plants and very easily grown. They may be planted in borders in warm houses, but grow equally well in pots. They like an abundance of water at all seasons. *C. giganteum* has recently been figured in Garden and Forest, so that I need only mention it here among those which are in flower now. It blooms twice or three times annually.

Callipsyche is a small genus of Amaryllids which is represented in gardens by two species—namely, *C. aurantiaca*, a native of Ecuador, at an altitude of 8,000 feet, and *C. mirabilis*, from the Andes of Peru. The former is now in flower in a stove at Kew. Although not possessed of much attraction in the shape or color of the flowers, yet the plant is decidedly interesting, and well worth a place in a collection of stove-bulbs on account of the peculiar form of the flowers. The bulbs and leaves are similar to those of Urceolina, while the scape is erect, fistulose, two feet high, and bears an umbel of a dozen yellow flowers, which spread horizontally, and are tubular, two inches long, with the stamens protruding three inches beyond the recurved tips of the segments of the corolla. The flowers remain fresh on the plant about a month. The treatment for this plant should be the same as for *Urceolina pendula*.

Eucharis grandiflora (*Amazonica*) is, of course, in flower now. We find that by treating this plant as if it were a tropical Daffodil, or, in other words, giving it plenty of water at all times, a rich loamy soil, not too much sunshine and not too frequent disturbance at the root, never, in fact, so long as it is doing well, it will flower twice or thrice annually, keep free from the mite (Rhizoglyphus) and behave itself exactly as a good stove-plant should. Many cultivators fail with this and the several other species of Eucharis through subjecting them to a process of alternate high-feeding and starving, which may answer for some bulbs, such as Hippeastrums, some Crinums and Nerines, but which is quite opposed to the nature of Eucharis.

Nerines.—Except *N. flexuosa* and *N. Munselli* these are now all over, and the plants are in full-leaf growth. Our chief difficulty with these beautiful bulbous plants is owing to the absence of sunlight in winter, when they are in full growth. In America the Nerines ought to become general favorites, your bright sunshine, even in the depth of winter, being favorable to their growth. In Ireland, especially in the Glasnevin Botanic Gardens, in the Scilly Isles, in Baden Baden, and even so near London as Windsor, Nerines are a success, but they do not grow satisfactorily in any garden which is within reach of London fogs. Given a fair amount of sunlight in winter, and Nerines will prove most valuable greenhouse-bulbs. They grow from November to May, rest from then to October, and then push up their gorgeous and elegant flowers.

Bomareas.—These are not bulbous, but they are Amaryllids, and they are in bloom now. I propose to send shortly a series of notes on this genus for publication in Garden and Forest. In the mean time I may call attention to three of the best of them, which Professor Sargent saw in flower and admired at Kew this week. They are *B. Carderi*, *B. Caldasiana* and *B. frondea*. The first of this trio has scandent stems from eight to twelve feet long, clothed with broad leaves and terminal umbels of flowers as large as those of Lapageria and of similar texture. Their color is rich rose with conspicuous spots of brown on the upper part of the segments, the inner segments being greenish white. I have seen an umbel of flowers on this species which measured two feet in diameter and contained over fifty flowers. *B. frondea* has stems eight feet high, lanceolate, dark green leaves five inches long, and terminal umbels of rich golden yellow flowers, with a few spots of brown. The head formed by the flowers is suggestive of the umbel of *Alstræmeria aurantiaca*. *B. Caldasiana* has broader leaves than the last-named and looser umbels of flowers, which are shorter than in *B. frondea* and colored a deeper yellow, with larger spots of brown on the upper half of the segments. This species and *B. Carderi* have not been out of flower since June. They are planted in a shallow bed at the south end of a sunny greenhouse, their stems being trained against the roof, from which the flowers hang gracefully.

Lachenalias are pushing up their flower-spikes and promise to make a fine show presently. The perpetual flowering *Cyrtanthus Mackeni* is as attractive now as it was in June. Its near ally, *C. lutescens*, ceased flowering about a month ago.

The first of the Hippeastrums to bloom is the sturdy and really useful *H. aulicum*, the variety known as *superbum* being better than the type. I like this plant because of its evergreen nature and its vigorous free-flowering habit, characters which unfortunately do not belong to many of the species or varieties of Hippeastrum.

London. *W. Watson.*

Cultural Department.

Strawberry Notes from Wisconsin.

AMONG the more progressive market-growers, the Warfield is the most popular variety at the present time. It was given the first place at the last meeting of our state horticultural society, and in our trial grounds at the experiment station it proved decidedly more productive than any other variety tested. Its rich glossy color and its firmness, coupled with remarkable productiveness, are its specially valuable qualities. We have several varieties, however, that yield fruit of better size and quality. The appearance of the berry is sufficiently like that of the Wilson to permit the two varieties to be packed in the same case without detection unless by the expert, a fact which makes the latter sort popular as a fertilizer for the Warfield.

The Haverland was second in productiveness on our grounds. In color, this berry is decidedly inferior to the Warfield, though it averages a trifle larger. In quality there is little difference.

Lady Rusk has proved disappointing. It is fairly productive, but the fruit is irregular in shape, inferior in size, and poor in quality. In firmness it does not surpass the Wilson or Warfield.

Shuster's Gem was only fairly productive, and the quality is inferior. Edgar Queen was productive and promising. General Putnam has value as a family variety, the berry being large and of good quality, but its color and softness do not commend it for market.

Our finest early variety was the Van Deman, which gave its first ripe fruits three days before any other. A peculiarity of this sort, if we may judge it from the past year's record, is that it ripens the bulk of its crop very early, several days before any other variety tested. This, with its other good qualities, will probably give it a place as a market variety. It is of fine color, firm enough for a near market, fairly productive, and of good average size and quality. Though ripening first, its crop held out through the entire strawberry season. This, together with the fact that its flowers are perfect, should give it especial value as a family variety.

Our finest late sort was the Eureka, which proved much more productive than the Gandy, while equal to it in all other respects. The Jessie succeeds admirably with some growers, while it is disappointing with others. At its best it is a remarkable variety, the plants being very productive of fruit of the largest size and superior quality. On our own grounds it has done only fairly well. The old Wilson still holds its own with a few market growers, notably J. M. Smith, of Green Bay. Where vigor has been maintained in the plants, and high cultivation is given, it must be confessed that this old stand-by has few superiors.

Perhaps it should be added that the comparative earliness or lateness of different sorts may depend considerably upon the weather during the strawberry harvest. If the weather is dry at the commencement of the strawberry season maturity in the earlier sorts will be hastened. If abundant rains fall after a few pickings have been made, the later sorts may take on a new growth, which will delay their maturity considerably. This was well illustrated on our own grounds the past season. Dry weather prevailed until the majority of our varieties had commenced ripening, when abundant rains followed, and the maturity of the later sorts was considerably postponed. Owing to this the strawberry season was considerably prolonged, berries having been gathered for the table during an entire month.

University of Wisconsin. *E. S. Goff.*

The Hellebores.

THESE plants are the best of their season, and they are not much inferior to the choicest afforded by the garden at any time of the year. Helleborus is a genus of perfectly hardy, herbaceous perennials, with or without stems, varying in height from six to twenty-four inches, with deciduous or persistent palmate or pedate leaves, and inhabiting Europe and Asia. The common names, Christmas and Lenten Roses, are given on account of the season when the flowers of the two sections appear; but, of course, they are not Roses, but members of the Buttercup family. The popular name, Christmas Rose, Christmas Herb, or Christ's Herb, originated with the Dutch, Rose having probably been substituted for Herb from the resemblance of the flowers to those of a wild Rose.

According to the "Genera Plantarum" of Hooker and Bentham, there are ten or twelve species. Mr. J. G. Baker, however, in the monograph of the genus which appears in the *Gardeners' Chronicle* for 1877, recognizes only six species, and classes other forms as variations of two of these distinct types, or species closely allied to them.

H. lividus is a pretty Corsican species, with flowers of a bright greenish color, known in gardens since 1710. A variety, Integrifolius, differs slightly from the type in the foliage. Both flower in spring. *H. fœtidus* is a large species with decorative, persistent foliage, producing large panicles of greenish flowers, margined with dull purple, during the early months of the year.

The Black Hellebore (*H. niger*) is the best of all the species, and a first-rate garden-plant. This is the true Christmas Rose, a very variable plant common to central and southern Europe, and first introduced into England by Gerard in 1596. The typical form is from six inches to a foot high, the pedate, coriaceous leaves on stout petioles, which proceed from a spreading underground stem, as do the erect scapes, which, during the autumn and winter months, bear from one to three cup-shaped, pinkish white flowers about three inches in diameter. The variety Altifolius, or Maximus, is the largest and most handsome, the pure white flowers, suffused with pink externally, from four to five inches across, and at their best in November and early December. *H. niger angustifolius* is an extremely floriferous sort, a trifle smaller than the type, flowering in October and November, and of pure white color. This variety is the best for forcing and pot-culture generally. Madame Fourcade is an excellent pure white form of *H. niger*, blooming in November and December. In the variety Major the blossoms are like those of Altifolius, but somewhat smaller, and developed in December and January. Riverston's variety has large pure white flowers, which are borne in great abundance during November and December. Only a few days ago I picked a large cluster of flowers from a plant of this variety in a Massachusetts garden. The leaves were a trifle ragged, but the large pure white flowers were in excellent condition. The blooms of the variety Rubrus are of a charming pale reddish tint, large, and expand in January. This is a free-flowering variety, very distinct and useful, being the only Christmas Rose with red flowers. *H. niger vernalis* (*Caucasicus*) is another handsome kind which blooms in January, the flowers being large, pure white, tinged with rose externally, and delightfully fragrant. Several other varietal names are given to alleged forms of *H. niger*, but the characters of the plants thus distinguished, excepting one known as Variegatus, which has leaves of green and white, coincide so markedly with those of the kinds already mentioned that it is sheer folly to perpetuate them.

H. viridis has ornamental foliage, and is sometimes grown on that account. The flowers are bright green, from two to three inches in diameter, and produced in spring. It is a native of Western Europe, and is said to have escaped from cultivation in some parts of our eastern states. The following are ranked as sub-species of *H. viridis: H. Bocconi*, a form from the mountains of Etruria, in cultivation ten or fifteen years, flowers green and agreeably odorous. *H. cyclophyllus*, a green-flowered, Grecian plant, unknown in gardens; *H. graveolens*, a Hungarian form, with greenish flowers, tinged with purple; *H. intermedius*, a native of Austria, flowers green and purple; *H. luxus*, also from Austria, with pale green flowers; *H. purpurescens*, the last and by far the best of the group, which, with *H. Bocconi*, are the only forms really deserving general attention. The former bears large, deep, purplish flowers of large size, and has been admired in gardens for seventy years; *H. orientalis* is a Grecian species, introduced about 1839. It is about eighteen inches high, and produces white flowers, with purple margins in late spring. A comparatively large number of sub-species are built on this plant as the type. Among these are *H. abchasicus*, with greenish purple flowers, and cultivated in European gardens for a quarter of a century; *H. Antiquorum*, a beautiful form, with pale purple flowers; *H. atrorubens*, a very desirable kind, with large flowers of deep purple color; *H. Caucasicus*, with pale green flowers, and wholly distinct from the *H. Caucasicus* (*vernalis*) of the niger group; *H. Colchicus* is from Asia Minor, and one of the best of the entire genus, with large and abundant rich purple flowers; *H. guttatus*, an attractive plant from the Caucasus, having flowers pure white, spotted with purple; *H. odorus*, a native of Austria, bearing numerous green and fragrant flowers; *H. Olympicus*, bearing in winter white flowers tinged with green, and *H. pallidus*, a similar plant.

The Orientalis group contains, in addition to the above, numerous varieties, and some plants which are presumably hybrids of the Viridis and Orientalis sections. The finest of these are, Apotheker Bogren, large, rich reddish purple; Frau Irene Heinmann, bright purple, with reddish spots; Gertrude Jekyll, very fine pure white; Leichtlini, white, spotted crimson, and Punctatissimus, pale purple, freely marked with spots of a much darker shade. It is evident that *H. niger* and *H. orientalis* yield nearly all the plants of the genus which are of value in gardens. These, at any rate, will be found satisfactory to ordinary growers, and the others can be added for investigation and experiment. The student and hybridizer will find in the Hellebores a wide field for interesting work, and all who cultivate plants for their beauty alone will be agreeably surprised with the results of any extra attention given to them.

Cambridge, Mass. *M. Barker.*

The Cranesbills.

THESE plants have always been of peculiar interest to me, the rarer forms always possessing great charms; few hardy perennials combine more handsome foliage, with showy flowers borne in profusion, or are more easily grown. They are in no sense weedy, and do well in almost any soil and in all exposures. They must not be confounded with the tender Geraniums, which properly belong to the genus Pelargonium.

Geranium sanguineum is one of the oldest cultivated species; its dark red flowers are borne continuously through the summer and into late autumn, and show to advantage against the dark green, handsomely cut foliage. The variety Lancastrænsis has light pink flowers veined with deeper color. *G. Endressii* has light green, nicely cut foliage and clear pink flowers, but unfortunately it is a little tender here. The double form of *G. pratense*—one of the oldest of old-fashioned flowers—is really a showy plant, and gives an abundance of bloom up to the late summer months. The flowers are very double and deep purple in color.

G. peltatum is especially noteworthy in its foliage, for, though the flowers are freely borne, they are of secondary consideration. *G. Ibericum* is very choice, with deeply cut and fringed foliage and showy open panicles of deep violet flowers, an inch or more across and veined with purple. It makes a bush one and one-half to two feet high, producing an abundance of flowers throughout July and August, and the variety Platypetalum is richer in the color of its flowers than the type, and the whole plant is not quite as large in growth. With us it is a freer bloomer. Some time since I imported a plant as *G. Londesii*, and it has proved the best in my collection, forming a large, self-supporting broad bush, three feet high, and heavily enveloped in late July with open, flat panicles of light blue flowers, fully an inch and a quarter in diameter and handsomely veined with purplish violet. It is very distinct from any other species that I have, both in foliage, flower and habit. I have doubts, however, as to the correctness of its name.

G. Wallichiana is of prostrate, trailing habit, with light green, palmate foliage and deep red flowers, borne sparingly all summer. It is a desirable plant, used as a trailer, and its Himalayan habit lends peculiar interest to it.

Reading, Mass. *J. Woodward Manning.*

Fertilizers for Tomatoes.

YOUR remarks on Fertilizers for Tomatoes interest me. I have become satisfied that the difficulty with Tomatoes in this latitude, where they are, as a rule, very unsatisfactory in midsummer, is very largely due to the general impression that heavy manuring is not good for them, especially the heavy use of stable-manure. A large part of the benefit of well-rotted stable-manure in a hot climate comes from the abundant carbonaceous matter mixed with it, which tends to keep the soil from baking hard in the summer heat, and pre-

serves moisture. I have been particularly struck with the success of an old negro, a porter in a mercantile house in Raleigh, in growing Tomatoes and keeping them up all through the summer. So I sought him out and asked about his method of cultivation. "Well, boss," said he, "I'se jess got a bit of a gyarden to 'muse myself moonlight nights. I keeps a pig and some chickens, and saves their manure, and my boy scrapes up the hoss droppin's on the road, and we gits rich dirt and mixes it all up in a compose pile ready for spring. Den, in April, when I sets out my Termatter-plants, I digs a big hole for every one of 'em and fills it mos' full ob dat compose. De holes is ober a foot deep. On de top I puts some of de sile, and sets de plant right in de middle, wid a stout stake alongside ob it, and ties de vine up to it; and it jess grows and grows, and keeps a-growin', an' I cuts off de side shoots as soon as I see de blossom on 'em. Dat's all, boss. Dem plants jess keep a-growing', and I cuts out de old straggly stuff now an' then, and has fresh shoots an' Termatters all de time." There is a lecture on Tomato culture! Such heavy manuring may not do everywhere, but in this climate of alternate deluges and droughts the old colored man's plan works well, and will be tried in my own work next season. I am not sure, however, that it is advisable here to train the plants off the ground. Close training to one main stem exposes this stem too much to the sun and makes it short-lived. I am inclined to believe that better success will be had here from vines sprawling on the ground, and shading with their foliage not only the stem of the plant but the ground as well. I have abandoned varietal tests of Tomatoes, and will, hereafter, study modes of culture and development.

Raleigh, N. C. *W. F. Massey.*

Dwarf Callas.—About two years ago there appeared in the *Gardeners' Chronicle* a cut of a new dwarf Calla, which created considerable interest among gardeners and florists, inasmuch as it was doubted whether its dwarfed character could be perpetuated. That it is a genuine novelty has been fully proved by a local florist, who imported a number of bulblets last spring. The bulblets were very small, scarcely averaging the size of a pea. About ninety per cent. of the importation lived, and some have now reached the blooming stage. There is every probability of its becoming an important winter-blooming pot-plant. In a six-inch pan it makes an elegant specimen, and it would prove of great value for the decoration of the dinner-table. The plants I saw were single crowns with twelve fully developed leaves, one open spathe, and two others in the process of development, and the whole plant was not more than ten inches high from the soil. The spathes had six to

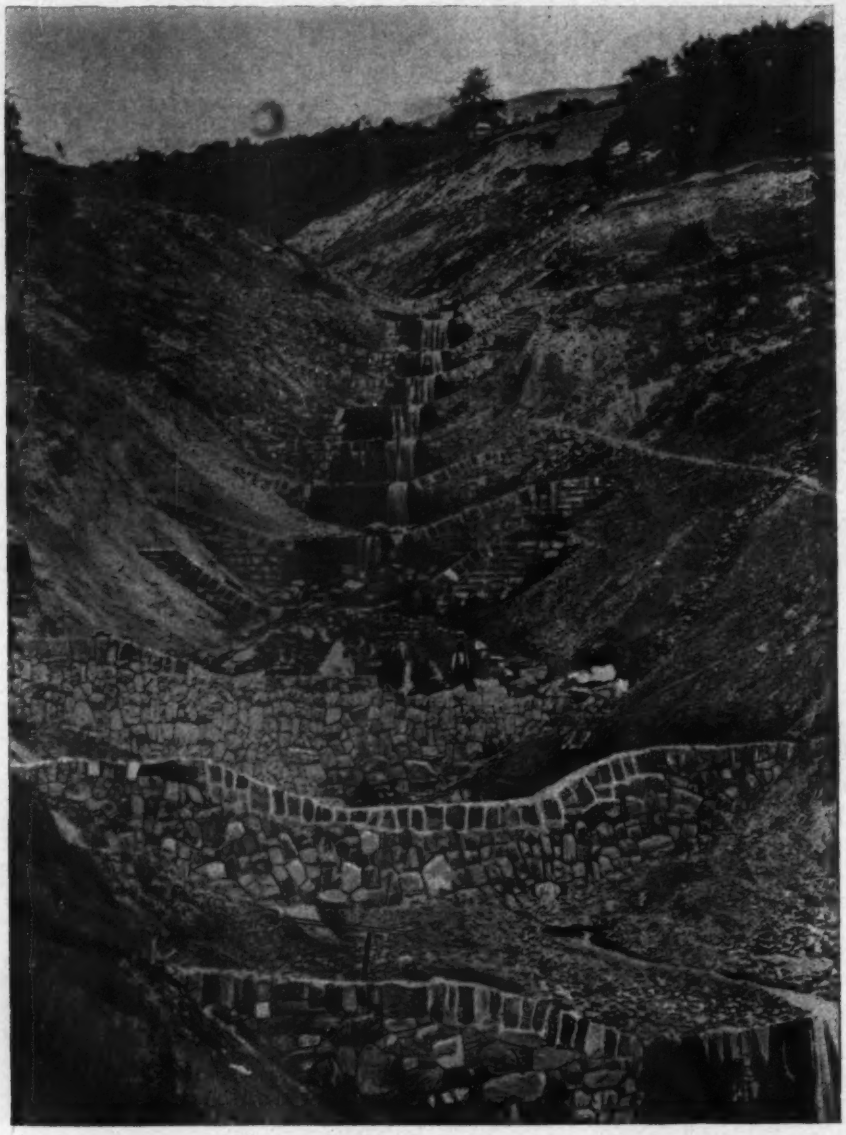

Fig. 99.—Corrective Works in one branch of the Torrent of Grollaz.—See page 621.

eight inches of clear stem, the expanded portion measuring two and a half to three inches across, thus making one of the neatest flowers possible for boutonnières.

Any one who knows how to grow the common Calla need have no trouble growing this. A light soil, with abundance of well-decayed manure, is preferable, with enough drainage to allow water to flow off quickly. The best plants I saw were growing on a bench near the glass, in a temperature of fifty-five to sixty degrees, and with a light shading even in December. Others were growing in a cooler house, quite exposed, in a drier atmosphere, but did not appear to thrive so well, and were dwarfer, or stunted. The bulblets as they appear about the crowns may be taken off as soon as they develop one or two leaves, and as they need no ripening they will grow at once into neat plants. I believe good marketable plants with one spathe could be grown in five-inch pots.

Violas.—I lately picked, from under a slight covering of Pine-needles, a bouquet of these in yellow and blue. Unprotected, they would have been all withered by frost; but why are they not oftener seen in gardens? They are hardier than Pansies, and will almost take care of themselves. But they become ragged with age, and so it is better to transplant a few of the seedlings, which can always be found about an old bed. They bloom all summer long, and nothing is neater for shallow dishes.

Wellesley, Mass. *T. D. H.*

The Forest.

The Subjection of Torrents by Reforestation of Mountains.—IV.

THE TORRENT OF RIOU-BOURDOUX.

THIS torrent, classed among the incurable ones, and famous for its devastations, was the most powerful of all those which raged in the French Alps. Starting from mountain crests at an altitude of 2,900 meters, it rushed into the Ubaye 1,800 meters lower, after a course of three and a half miles with an average pitch of 30 to 100. Its catch-basin is rimmed with ridges of tertiary rock, and at an altitude of 2,400 meters it enters the black Jurassic clays. Thus the Riou-Bourdoux, while yet near its source, rushes through deeply cut banks. It receives numerous affluents, most of which are justly entitled to be ranked as torrents already formidable. All these affluents flow between banks cut nearly perpendicularly to a depth sometimes of 100 meters, absolutely bare, bluish black in color and sinister in aspect. Fifteen years ago the Riou-Bourdoux was in full activity, steadily cutting under the foot of its banks and starting land-slides over enormous areas on both shores, which tended to join each other from opposite sides, but were quickly separated by the torrent, which, hollowing out its bed between them, carried into the valley prodigious quantities of material.

The mouth of its "channel of erosion" is found some 1,500 meters above the Ubaye, where the torrent spreads out over an immense cone of débris, the base of which is crossed by the national road from Montpellier to Coni. The area of the cone, nearly 600 acres, presents a most desolate aspect, without a trace of vegetation. With each great storm the wash flows over the cone, spreading now over one side, and again over the other. The national road is only a trail across the débris, ceaselessly covered with débris, so that large sums are annually absorbed merely to keep it in passable condition. Such was the situation in 1875, at the time when the works of restoration were declared necessary for the public good.

To-day the torrent is tamed, and, thanks to operations carried out along a definite line and with persistent energy, we are masters of the entire upper basin, where over 3,000 acres of restored forests occupy the degraded lands. The affluents are corrected, the bed is rectified in the channel of erosion, and after next year the subdued torrent will flow like a peaceful brook through a definite bed prepared on its cone, leaving an area of 593 acres to be restored to agricultural use.

In this instance especially was the suppression of the torrent a public benefit. It meant the rescue from certain ruin of the territory of an entire commune; the assured existence of a vigorous population on the frontier; the protection of a rich valley against deposits which are a destruction to arable lands, security to the threatened city of Barcelonette, and an open highway over the only road to France, an important point in connection with national defense in a notable part of the Alpine frontier.

THE COMBE OF PÉGUÈRE.

The ravine opens out at an altitude of over 2,000 meters on the east side of the mountain which overlooks the health resort of Cauterets. Long ago subdued by the vegetation which protected its catch-basin entirely, this gorge had again assumed activity, which increased as its basin was more and more denuded by the habitual passing of flocks of goats and sheep.

In 1884 the danger became more serious; the security of the thermal springs of Rallière and others was threatened, travel over the international road from France to Spain became dangerous, and the safety of Cauterets seemed threatened.

The alarm among the people in the valley was great, and their authorized representatives hastened to lay their grievances before the Minister of Agriculture.

The peak of Péguère, composed of granitic rock, presented this peculiarity, common in all the neighboring mountains of the same group, that on the crests the rock is broken in all directions, sometimes to very great depths. The walls of the ravine furnish a striking example of this; they are formed of blocks of all dimensions, with sharp outlines produced by the dislocation of the primitive rock, and with deep crevices between them. They are surrounded by sandy earth and placed in a most threatening state of instability. The least disturbance, the action of gravity alone, may start a movement among these rocks, but water especially brings on the great disasters. In winter, it filters in abundance into innumerable fissures, congeals there, and splits the rock in every direction. In spring, with a sudden melting of snow or with heavy rains the sands which fill the spaces between the blocks are washed away by the waters, and, equilibrium once broken, the movement begins. The blocks thus started leap down the smooth steep slope, dashing themselves to pieces, and sometimes bombarding the establishment of Rallière or that of Mauhourat with their fragments. Such a destructive force tends to increase more and more, and would soon threaten the town of Cauterets if measures prompt and energetic enough to subdue it were not taken.

This state of affairs is shown in the report of the survey made in 1884 by the foresters called upon to undertake the work of suppression. It was stated in the first report that in dry times the sands flowed into the hollows of the valley like sand in an hour-glass; the wind lifted it in clouds; in times of rain it was borne away by the waters. There was no rest in this ravine; incessantly some pebble starting dislodged larger blocks, which, like avalanches, descended with a terrible crash, shivering the rocks which they struck, and tearing the earth and trees as they bounded along.

The most intrepid mountaineers would only venture to cross the mouth of the Combe on a run, while into its depths they never thought of penetrating, so constant was the peril from falling rocks, which the slightest touch might dislodge.

Of course no work could be done here during the bathing season, the operations were restricted to the first days of spring or the last days of autumn. The construction of a system of walls on such a steep slope was not practicable, on account of the expense which their great number and size would involve.

The problem consisted essentially in retarding the motion of the more or less earthy sands, which keep the blocks in unstable equilibrium. Observation of the local climate, together with the nature of the soil, furnished a very simple and economical plan of solution. The plan was: (1) To clear the slopes of all loose blocks whose fall seemed imminent; (2) To reclothe, as far as possible, all the sands with a mantle of vegetation formed by plats of grass, and to calk, so to speak, all the spaces between the rocks considered reasonably firm; (3) To construct retaining walls of dry rock wherever the accumulated rocks left no chance for the grass to support itself.

This operation would leave no work of man visible except the retaining walls; the remainder would be transformed into a mountain sod, from which would emerge here and there portions of the protected rocks.

The execution of the work was exceptionally difficult; the necessity of working in the Combe only at rare times in order to avoid all danger to the thousands of bathers at the springs below; the total absence of roads and paths in the steep slopes; the lack of workmen accustomed to the perils which were to be constantly faced; the distance which it was necessary to transport sods; the danger from dropping the smallest stone in building the walls, lest it start an avalanche of rock; the lack of all shelter for the workmen; the difficulty of procuring water; constant dangers to the lives of the workmen—all these were discouraging conditions. But the workmen, following the example of their chiefs little by little, grew courageous and confident, and finally conquered all opposition.

The result of the first five campaigns exceeds the most san-

guine hopes, and the Combe has been subdued without damage or accident.

CONCLUSION.

The problem offered by the laws of 1860 and 1882 is now solved. Facts have abundantly proved that the solution is neither long nor costly, and that it is only necessary to aid nature by a series of small measures judiciously conceived and carried on with system and persistence.

The 579 square miles of forests recently created in the three regions, whether by the state or by communities and individuals, insure quiet for the future, and demonstrate by their vigorous growth how empty were the allegations of the politicians, who in 1860 ridiculed the possibility of reforestation. The task, indeed, is hard and thankless. It is on the most desolate mountain-heights, or in the depths of gorges, which they alone penetrate, that the foresters do their work quietly, often in face of public indifference, or even the hostility of selfish interests.

I can recall no nobler mission than theirs. Surrell was right when he said: "I dare to predict that the usefulness and the grandeur of this work will one day be recognized, and that it will have a place of honor among the great enterprises which will signalize this epoch throughout all coming time."

[A series of heliographs were shown at the Paris Exposition which vividly illustrated the magnitude and difficulty of the work of the French foresters in their campaigns against the torrents. Copies of many of these pictures have been exhibited at some of the meetings of the American Forestry Association, and some of them are now to be seen in the National Museum at Washington. Mr. Fernow, Chief of the Bureau of Forestry, has had plates made of some of them, and it is to be hoped that they will be published in a future Government report. On page 620 we give an illustration of a series of corrective works on the torrent of Grollaz, which will explain itself. The denudation of the mountains here was comparatively recent, and the Grollaz has only been a dangerous torrent in late years. In 1880 it had become a constant menace to the wagon-road between France and Italy and to the Mont Cenis Railroad, and at one time it seemed certain that the railroad would have to be moved to the other side of the arc, to which the Grollaz is tributary. But the steep-banked, narrow gulch, through which vast quantities of mud and stones were carried after every rain, is now a broad open bed. Its steepness is all taken up by the falls of the dams, and it carries no waste into the valley below. When the banks are covered with forest, the torrent will be definitely extinct. Of course, only a small portion of the engineering work can be seen in this picture, but the result of it all is, that not only are the road and the railroad safe, but canals for irrigation have been dug from the different levels made by the dams, and the Grollaz is now enriching the very fields from which it had once driven their owners.

We are indebted for the picture from which our illustration is made to Mr. Gifford Pinchot.—Ed.]

Correspondence.

In the Shore Towns of Massachusetts.—IV.

To the Editor of Garden and Forest:

Sir,—Marshfield formerly had a common. In earliest times it was the Training-field. The town ran a public road through it, and a religious society has a perpetual lease of a part of it as the site of its chapel. During recent years various persons have obtained permission to build horse-sheds on the remnants of the common, and there is not much of it left for future appropriation. Mr. Seth J. Ventress, who was born in this town, learned to lay brick and stone as they should be laid in structures that are to abide and endure, and he came to know more than anybody else about bakers' ovens and how to build them. He had $40,000 when he came to die a few years ago, and left $10,000 in trust to build Ventress Memorial Hall here, within three-fourths of a mile of the meeting-house, for a town-hall and public library. Daniel Webster's grave is in this town, and it is visited by thousands of the summer people. His birthplace, in the town of Franklin, New Hampshire, is not marked in any way.

Kingston has no park or common, or rights on the shore. Duxbury has a town-landing, perhaps two of them, not used. The Standish monument is here. It stands on the slope of a hill, because the top, the right place for it, could not be bought for this purpose. The Monument Association owns a small area around its base. It should be considerably extended and improved, and made a convenient and attractive place of resort for great numbers of people. This region is full of interesting local history and historic places.

Plymouth keeps its old Training-green, or some of it, a scant acre now. There is a tract of perhaps five acres around the great statue of Faith, and a small area about the celebrated Rock, down by the water-side. Coles Hill, where a few of the first burials were made, is a small, steep hill-slope just above the Rock, and is used as a park or place for seats for those who wish to contemplate the Rock and enjoy the view of the water. Burial Hill, five or six acres, is practically a park, and has many visitors. There are few interments now.

The great possession of Plymouth is Morton Park, 150 acres of unsurpassable woods, lying along the shores of Billington Sea. It has been described in your pages in more graceful prose than my pen can write. Mr. Morton seems to know every tree and every inequality of surface in the park. The city ought in time to own the shore lands entirely around Billington Sea. Plymouth is a very large town. It is eighteen miles across it, from the Kingston line to that of Sandwich. This great region is mostly woods, and is well watered. People say that a man can camp by a different lake every day in the year in this town, but I did not have time to camp by all the lakes or to count them. It is an enchanting region for summer residence, and people are finding it out in increasing numbers. There will be thousands of summer dwellers by these beautiful lakes in a few years. Every acre outside of Morton Park is a private holding. Intelligent men here say that the permanent reservation of a strip of woods on each side of the public roads would greatly improve them. As much of the land is valued at twenty-five cents an acre for taxation, it would probably not be difficult to make a public holding of a belt a few rods wide on each side of all the principal public roads. This would give to great reaches of country much of the aspect and character of a park.

The method of keeping the public records of the town has been brought to a wonderful degree of accuracy and convenience. To the student of civilization these records are among the chief attractions of the place. The Pilgrim Society has an interesting collection of furniture, implements and other articles used by the early inhabitants. It is a valuable instrument for awakening and fostering interest in local history, and influences working to this end are much needed in the shore towns.

Sandwich has no town holding of any kind for a place of public resort. The Sandwich Glass Company had a small common near the glassworks, with large trees and seats for the operatives. It was a pleasant and valuable resting-place for them, but the company has gone out of business and the common is uncared for. There is a piece of remarkably interesting scenery near the road from Sandwich to Mashpee. It is a vast wooded hollow, or deep valley, which happens to have just the right proportions to be impressive. It ought to be defended from forest-fires, and its sylvan beauty perpetuated. There is no place of public resort in Bourne, and the boys of this town say they have no right to meet anywhere out-of-doors for athletic exercises, amusement or mutual improvement. Playing ball along the public highway causes complaint and is dangerous to persons passing, and if the boys assemble in a field or pasture they are warned away as trespassers. The boys think there should be a Town Field, or public playground, and some of the leading citizens take the same view of the matter. Intelligent men here feel much interest in the law relative to preserving ornamental and shade trees on the highways of the state. It is Chapter 196 of the Acts of 1890. The people here say their roads would be much better if the trees along the road-sides were left standing; that the highways are often injured, and all their beauty is destroyed by widening them unnecessarily; and that when they are straightened, and the old curving lines are abandoned, the scenic interest and value of the region is impaired, and the drives are rendered unattractive. Half-way between Buzzard's Bay Station and Bourne are the remains of an old trading-post, which was established here in 1627. The old cellar-pit and its walls are still, to a great extent, unchanged, but the land has been sold recently, and is likely to be improved, and this interesting monument of early commercial activity will probably soon be destroyed.

There has been considerable successful tree-planting in Barnstable. I walked about a piece of woodland which was planted

by its present owner, and which has long yielded valuable annual crops of timber for fuel and other purposes. It begins to look really forest-like. The Pitch Pine (*Pinus rigida*) is the tree which has been chiefly planted in this region. There are no considerable public holdings for places of resort in Barnstable. Old citizens say the town formerly held several hundred acres of town or common land, but that these tracts were seized by various persons who lived on them till they gained title by occupancy.

Yarmouth had, in earliest times, a little reserve, or common field of clay for making brick for the people. It was much used long ago, but not in recent years. A few years ago the town voted to fill it in and fence it, and it is now a pretty bit of common, with trees and grass, perhaps an acre in extent. There was formerly a town-landing on Bass River, but it was sold a few years ago. In early days Yarmouth granted portions of her common lands to various persons who were to retain these holdings as long as they "improved," that is, used them. These titles were not intended to be transferable to other citizens, but to revert to the town if the first holders should leave the lands. But the persons to whom the grants were made sold their rights, or claims, to others, who transferred them in turn, and the town's title was ignored. The town appointed a committee of lawyers and others to inquire into the matter. They reported that it did not appear to be worth while for the town to undertake to re-assert title to these lands. Bass River, between Yarmouth and Dennis, yielded $600 to each town, last year, from the sale of the right to the herring fishery.

Dennis is a beautiful town, full of quiet, satisfying scenery. I saw a Cedar-swamp here, with unusually large timber. The "Old Whaling Ground" on the shore is an interesting town-holding. The editor of the *Register*, in Yarmouth, who has a remarkable knowledge of the local history of the region, told me that the Old Whaling Ground belongs jointly to the towns of Dennis and Yarmouth, as it was a common, or town, possession when the two towns were one. There is a very old Indian burying-ground on the shore of Scargo Lake, in Dennis, about an acre in extent. The town fenced it last year. The title is in the two towns, Dennis and Yarmouth. The Indians buried here were of the Nobscusset tribe. There is no park or common in Dennis belonging to the town. An acre or more around Liberty Hall, owned by an association, is called the Park. It is not, at present, much used or cared for.

There is a pretty little circular green near the church in Brewster, which belongs to the parish, and is, possibly, a fragment of the ancient Training-field. There is a town-landing on Cape Cod Bay, perhaps 200 feet of shore-line, at the end of a street. The town owns a herring or alewife brook, and appoints an alewife committee at the annual town meeting to catch the fish and dispose of them. Formerly the fish were abundant, and the town would often have 300 barrels of alewives a year. A family of eight persons would then have a right to a barrel of fish, and could buy more at thirty or forty cents a barrel. The committee now sells the fish to anybody who wants them. The gross catch is small of late years, not worth more than $100 usually. The population is decreasing, but it is likely soon to receive considerable annual reinforcements of summer inhabitants.

There is a green of perhaps an acre and a half in front of Pine Grove Seminary, in Harwich, the gift of Mr. Sidney Brooks, principal, and former owner. The town owns Herring River, from Long Pond to the ocean, about six miles, and has recently sold the fishing right for five years for $615 a year. Three citizens bought it to enable them to control the water for the benefit of their Cranberry-fields. Some of the people wish the town to sell the public fishing right once for all, finally and entirely—that is, to relinquish and extinguish this particular holding. There are many fine trees along the streets in the villages of this town.

Chatham appears to be the most easterly point in the state. There is no common or park. The town probably has a right in the long beach, but it has not asserted it lately. The marsh-hay was formerly sold by the town every year. There is a very old cemetery; the title is in the town. It has not been very well cared for. Some valuable materials for local history have been lost by the deaths of several old inhabitants within a few years. Champlain was here in 1606, I believe, and had some rough experience. He broke his rudder, probably on Pollock Rip, and found it difficult to make a landing. The Indians helped him, but afterward he had a fight with them, and two of his men were killed. He called the place Port Fortune, and set up a cross on the shore. Some of the people here know the place, approximately at least, and it would be well to mark it in some way The shore region here is interesting and attractive, and the summer people are crowding in. The depth of the water along this part of the coast is constantly changing, and the wariest navigators meet surprises. One of the great chart-makers of the world lives here, and his fame is known in all littoral countries.

Boston, Mass. *J. B. Harrison.*

An Indian Orchard.

To the Editor of GARDEN AND FOREST:

Sir,—When the whites settled in Oneida County, in the centre of New York state, they found there an Apple-orchard owned by the Tuscaroras. It was long known as the "Old Indian Orchard." The trees were set without the least consideration of order, and they numbered several hundred. The sorts were varied, and did not correspond to the cultivated fruits, but were evidently seedlings from those in cultivation. We have now at least one of these, known as the "Indian Rareripe," grafted about the state. It is a large, excellent, handsome, early-autumn Apple. It was the best mid-early fruit we had before the advent of Porter and Gravenstein and Strawberry. Whether other sorts from this source are still propagated I cannot say.

The Tuscaroras reported that the orchard was on their land when they came from the south to join the Iroquois League. This is possible, but not probable. It was certainly planted somewhere near 1715 or 1720, when they reached their northern home. They had come into close contact with the whites in Carolina and Virginia; and it is most likely that they obtained the seeds of them and brought them north and planted as soon as they reached here. At any rate, the Indian orchard and the arrival of the Tuscaroras are two events that closely coincide. Had the orchard been planted by the Indians already here, it is unaccountable that they did not have more such plantations. But the Kirkland orchard, of which I own the remnant, planted in 1791, was the only other plantation of Apple-trees in central New York in the last century.

Were the Indians in any sense horticulturists? We have been compelled lately to give over our early classification of them as strictly hunters and fishers. They were fond of agriculture. The Mohicans and Iroquois, as well as the southern tribes of Cherokees and Choctaws, were accustomed to raise large fields of Potatoes, Maize, Tobacco, Pumpkins and Squash. Those who lived far enough southward cultivated Cotton, which they wove for clothing. It was an article of traffic, as well as Tobacco and Corn. Not having suitable tools, they adopted the plan of burning over a tract of land and using it for a garden. This was sufficient preparation for Corn, vines and Tobacco, but would have been valueless for the European grains.

The fruits repeatedly spoken of by the early visitors and colonists are Strawberries, Mulberries, Raspberries; but all these are mentioned invariably as growing wild. This is not to be wondered at, when we remember that our own people did not to any extent cultivate the Strawberry and Raspberry until toward the middle of the present century. Fifty years ago we relied for these and for Grapes almost wholly on wild vines. In Brown's "Genesis of the United States" will be found letter after letter going over the fruits with which the Indians regaled their visitors, or enumerating those found on the river-banks and in the villages. Invariably all fruits are spoken of as wild. This admirable work carries us into direct contact with original documents. Bancroft, in his "Native Tribes of the Pacific Coast," makes it clear that the western Indians also were entirely deficient in the arts of horticulture. Fruits of the Rose family were always wild. So we come very certainly to the conclusion that our Indian orchard came from seed procured from the whites, and was not the result of artificial improvements, or of selection of a natural sort fostered and taken advantage of by the aborigines. Such other orchards as were found in the west were of a date not anterior to 1700, and were the result of proximity to white people. The Wild Apple of America has not been the parent of any of our choice fruits; but we can invariably trace all our choice stock back to a parentage from Europe. The earliest imported seed was of Pippin, Pearmain, Bellefleur, Gillfleur and Swaar, and the blood of this early parentage can be traced in all the best fruits we now cultivate. The Spy, Wagener, Jonathan, Spitzenberg, Fameuse, Rhode Island Greening, Newtown Pippin are children or grandchildren of the well-known imported roots. Most of our early orchards were from imported seeds.

It seems clear that we have not given the Indians sufficient credit as land-tillers, but yet we cannot compliment them with any truth as horticulturists. Still, the fact that the Indians pre-

ceded the whites with their own rude arts of fruit-growing is interesting. The first orchard planted by the Six Nations, probably by the Sixth Nation, or Tuscaroras, anticipated the work of missionary Kirkland by about seventy-five years. The chief matter of lament is that we have not more minute records of the trees, the apples and the uses made of them. But we have at least one sort, and it should be kept as a historic landmark. If others have data either to corroborate or add to controvert my opinion, I shall be glad to know it. I believe no tree of the original Indian orchard remains. I hope to sustain in life one or more of the trees planted by Kirkland until the close of this century. That will make them one hundred and nine or ten years old.

Those who know the abundance of rich berries in all wild sections will not wonder that the Indians never saw any advantage in growing them in gardens. The Plum was their best large fruit, and was enormously abundant on all the river-banks and forest-edges.

Clinton, N. Y. *E. P. Powell.*

Notes.

Dandelions are blooming to-day on many of the lawns in this city and its suburbs.

In his *Plantes Potagères*, M. Vilmorin figures sixty-six varieties of wheat with clearly distinguishable charcteristics; but in the Agricultural Museum at Poppelsdorf, in Germany, no less than six hundred varieties are exhibited.

Mr. A. H. Church, in his "Food-grains of India," says that the millets constitute a more important crop in India than either rice or wheat and are grown more extensively, being raised from Madras, in the south, to Rajputana, in the north, occupying, in all, about 30,000,000 acres.

California during the year just closing has produced a more valuable crop of fruits and vegetables than in any previous one. Some of the statistics of shipments are 30,000,000 pounds of oranges and 78,000,000 pounds of other green fruits, 72,000,000 pounds of dried fruits, 47,000,000 pounds of raisins and 78,000,000 pounds of canned goods.

Fruit-culture, which is now a very important industry in Bohemia, is said to have been first practiced there on a very large scale at the beginning of the present century by French immigrants who had been driven from their homes by the Revolution. The results of their industry and their love of natural beauty are also to be traced in many of the parks which adorn Bohemian towns.

Colonel Pearson has expressed a fear, in an article prepared for this paper, that the copper mixtures used as fungicides may have a deleterious influence on the soil. Mr. Frank T. Shutt, chemist of the Dominion Experimental Farm, writes to the *Canadian Horticulturist* that the copper which reaches the ground from properly conducted spraying is so minute in quantity and insoluble in nature that no fear need be entertained that it will poison vegetation.

At a recent exhibition of the Royal Horticultural Society Baron Schrœder showed a two-flowered plant of the beautiful *Cypripedium insigne*, var. *Sanderæ*, which was unanimously awarded a first-class certificate. It differs from all other varieties of *C. insigne* (of which we have about twenty named) in having flowers of a uniform shining, soft yellow color, without spots anywhere, while the upper part of the dorsal sepal is pure white. We may look upon this as the nearest approach to an albino Cypripedium yet discovered.

One of the most famous and fatal poisons used in Japan, according to the *Inland Printer*, is obtained from the Bamboo. The young shoots of the cane, when they first push through the ground, are covered with fine, brownish hairs, which, under the microscope, appear to be bayonet-like spikes of crystals of silex, infinitely sharp and hollow. Small quantities of these hairs, administered daily in the food, bring on ulceration of the whole alimentary canal, simulating malignant dysentery, which eventually causes death.

In a paper prepared for the American Pomological Society, Professor Massey says that throughout all the coast region and the lower part of the Oak belt of North Carolina, the Fig produces good crops with literally no cultivation. Some attempts are now being made to raise figs for commercial purposes. In Halifax County one grower last year marketed his crop, from five acres of Figs, in a fresh state in strawberry-boxes, and realized a very profitable return. With modern facilities for canning and evaporating, there is no reason why Fig-culture cannot be made profitable in all the coast region of North Carolina.

The San Francisco correspondent of the New York *Tribune* recently wrote: "Allen Kelly, who has just returned from an inspection of the forests of the Sierra Nevada, declares that the only way for the Government to save the timber-lands from destruction is to withhold all mountain timber-lands now unsold and make a series of reservations from Shasta to the new Sequoia Park. All the high Sierras about the Yosemite must be reserved soon or the timber will be ruined. As it is, the timber is becoming so thin on these high plateaus about the Yosemite that the snow melts rapidly, and most of the water-falls in the famous valley are dry by midsummer."

As an illustration of the general law under which nature seems to avoid hybridizing, Professor Bailey cites the instance of the great genus Carex or Sedge, which occurs in great numbers and many species in almost every locality in New England, and in which the species are particularly adapted to intercrossing by the character of their inflorescence. Even between species of this genus but few undoubted hybrids occur. Among 167 species and prominent varieties inhabiting the north-eastern states, there are only nine hybrids recorded, and all of them are rare or local, some of them having been collected but once. Species of remarkable similarity may grow side by side for years, even intertangled in the same clump, and yet produce no hybrid.

Writing of Haidarabad, the capital of the Nizam's dominions in the Dekhan, in southern India, Bishop Hurst says, in his recently published "Indika": "The garden of the Nizam is public. . . . I never tired of wandering through its labyrinths enjoying its delightful fragrance, and examining the endless variety of its plants. Every art which these cultivators of flowers in India have arrived at by the experience of centuries is here employed, by rich designs in colors, by succession of flowering shrubs, and by a happy combination of large shrubs and the smaller plants. All the more delicate plants are in pots, and need to be watered every day. There are six millions of potted plants alone, to say nothing of the multitude of larger ones."

According to the *Pittsburgh Dispatch*, Mr. Arras, an engineer in the Government service, states "that the beginning of the end has come, so far as the White Oak in Pennsylvania is concerned. The Government lately gave a contract in this city for some square White Oak timber, of a size that a dozen years ago could have been found in the hard-lumber yards hereabout in an hour's time. After a persistent search the contractor threw up his contract, stating that he could not fill it. It was then given to another and, at the end of a fortnight, he reported that he had secured all but two pieces, and that they were not to be had. Mr. Arras then got the order modified, and, as changed, it was filled, after all the log-rafts lying in the river had been inspected."

To a correspondent who inquires which are the best varieties of the Carnation to use as house-plants, we would say that there are no varieties which can be classed among good window-plants. The Carnation is nearly hardy, and it loves pure air and a cool temperature too well to be a successful window-plant in the ordinary sense of the term. A temperature no higher than fifty-five degrees is best suited to it at night, and this is cooler than most living-rooms in American houses. The atmosphere is too dry for the healthy development of many plants, and as the Carnation especially rebels against such surroundings, other plants had better be selected. Of course, where there is a sunny window in a cool, well-aired room, some Chrysanthemums will do fairly well.

Dr. E. Lewis Sturtevant sends some interesting extracts from a translation from an Arabic treatise on agriculture and horticulture, which was published in the twelfth century in Seville. From these extracts it appears that in Moorish Spain as early as the twelfth century, of cucurbitous plants alone there were cultivated Cucumbers, Melons, Water Melons, Gourds and Benincasa for food, and the Colocynth was grown for medical purposes. The Pumpkin had not yet appeared. They show also that many varieties of each of these plants were in ordinary use, and these varieties are carefully described. In the cultural direction it is said that if the seeds of the Melon and Cucumber are soaked in honey the fruit will be of a sweet and pure savor; if in vinegar, in a certain way they become acid. If Cucumber-seed is soaked in fresh milk the fruit will become sweet. It may be added that this opinion is found also in Latin authors.

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